

IN THE CLAIMS

Please amend the claims as indicated in the following recitation of pending claims.

1. (Currently amended) A downhole hydraulic ram pump for lifting formation fluids out of a wellbore being an open hole, comprising:

a main body having an axial bore;

a formation fluid inlet connected to said axial bore at one end of said main body;

means forming a formation fluid outlet for conducting fluid flow from the other end of said main body;

a normally open valve means axially aligned with said main body located within the fluid passageway for permitting fluid flow conducted out of said formation fluid outlet end, and into a formation external of the pump;

a chamber means having a normally closed inlet means axially aligned with said main body;

means for receiving, landing, sealing, and securing said chamber means within said main body axial bore;

an annulus formed between said chamber means and said main body, means forming a flow passageway such that formation fluid can flow into said formation fluid inlet end of said main body, into said formed annulus, to said normally open valve means, whereas the formation fluid flow is permitted from said normally open valve means, into said formation fluid outlet, such that formation fluid flow passes from the said formation fluid outlet as discharge fluid;

said chamber means, wherein said normally closed inlet means is comprised of at least one normally closed valve means axially aligned with the said chamber means being located in the fluid inlet passageway for permitting fluid flow to said chamber means;

said chamber means, wherein said normally closed inlet is extended axially, aligned with said chamber means, having at least one side port for formation fluid flow to said normally closed valve means, forming a landing profile with restrictive shoulders and seal system to interact with said main body;

said chamber means having a normally closed inlet at one end, means forming a connection adapted for chamber tubing on said chamber means other end, said chamber tubing being added to said chamber means for desired chamber volume, having a tubing capping means affixed to the open chamber tubing end;

said chamber means, further including said chamber tubing and said affixed capping means, wherein an intrusive tubing means parallel or axially aligned with the said chamber means, through which at least one fluid outlet end adapted for tubing connection is provided, said intrusive tubing means penetrating and sealing against said affixed capping means;

said intrusive conduit tubing means providing a fluid passageway such that formation fluid can flow from said chamber means near said normally closed inlet means end, through said affixed capping means, to said adapted outlet end;

said chamber means, wherein an annular chamber is formed between said chamber means and said intrusive conduit tubing means, provides an annular collecting chamber for a gaseous substance ~~such as air~~;

a conduit means having at least one formation fluid inlet means, providing a fluid passageway for conducting said formation fluid downward is connected to said formation fluid inlet.

2. (Currently amended) A downhole hydraulic ram pump according to claim 1, further including a conduit means having whereas said conduit means further includes at least one sealing means such as a packer assembly providing a seal between the wellbore said open hole and said conduit means, having at least one landing profile means for receiving flow control devices and other useful tools tubing hanging devices, is connected to said hydraulic ram pump at said formation fluid inlet.

3. (Currently amended) A conduit means of claim 2, whereas said conduit means is comprised of tubing axially aligned with the said chamber means, creating an annular fluid passageway such that formation fluid flow in said annular fluid passageway is downward, into said formation fluid inlet and into said downhole hydraulic ram pump.

4. (Currently amended) A conduit means of claim 2, whereas said conduit means is comprised of tubing aligned parallel with said chamber means, such that formation fluid flow in said tubing is downward into said formation fluid inlet and into said downhole hydraulic ram pump.

5. (Currently amended) A conduit means of claim 2, whereas said conduit means is comprised of tubing coiled around said chamber means in a downward direction, such that formation fluid flow in said coiled tubing spirals downward reaching said formation fluid inlet and into said downhole hydraulic ram pump.

6. (Currently amended) A conduit means of claim 1, whereas said conduit means having at least one formation fluid inlet means that is controllable.

7. (Currently amended) A downhole hydraulic ram pump of claim 1, whereas at least one sealing means ~~such as a packer assembly~~ is providing a seal between the wellbore ~~said open hole~~ and said downhole hydraulic ram pump.

8. (Currently amended) A downhole hydraulic ram pump according to claim 1, ~~whereas a distribution piping means; further including a tubing means;~~ connected to said intrusive ~~conduit~~ tubing means adapted fluid outlet, providing a fluid flow path upward such that fluid can flow from said chamber means near said normally closed inlet means end, into said intrusive ~~conduit~~ tubing means, through said affixed capping means, to said intrusive ~~conduit~~ tubing means adapted outlet end, into said ~~tubing~~ distribution piping means, to a higher elevation or to a ~~an~~ earth surface elevation ~~for storage and use.~~

9. (Currently amended) A downhole hydraulic ram pump according to claim 1, further including said conduit means, ~~of claim 2, including at least one sealing~~

means providing a seal between said open hole, said conduit means, and said chamber means, whereas said intrusive tubing means comprises a tubing means; said affixed capping means comprises a wellhead means; said chamber means and conduit means originate from said wellhead means, stretching downward in a wellbore being an open hole, to said downhole hydraulic ram pump location, terminating in said respective hydraulic ram pump connections; said tubing means provides a flow passageway such that fluid can flow from said chamber means near said normally closed inlet means end, through said wellhead means, to said surface storage and use.

10. (Currently amended) A downhole hydraulic ram pump according to claim 9 1, whereas said wellhead affixed capping means provides a communication port to said annular chamber means.

11. (Currently amended) A downhole hydraulic ram pump according to claim 9 8, whereas said tubing distribution piping means extending from said wellhead affixed capping means provides fluid valves, flow controls for, and storage and-use.

12. (Currently amended) A downhole hydraulic ram pump according to claim 1, whereas said normally open valve means employs an adjustable spring or weight assist to open to maintain said normally open valve means in the normally open position, said normally open valve remains open until the adjustable spring force is overcome by said discharge fluid flow force.

13. (Currently amended) A downhole hydraulic ram pump according to claim 1, whereas said normally open valve means employs an opposing slideable piston and cylinder means responsive to formation fluid pressure acting on both said normally open valve means and said opposing piston and cylinder means to approximately balance the valve closure forces;

said valve closure forces are slightly biased to close said normally open valve means;

said normally open valve means and said opposing piston means are integral having an axially aligned communication port;

additionally having an adjustable spring assist to open said normally open valve means employs an adjustable spring to maintain said normally open valve means in the normally open position.

14. (Currently amended) A downhole hydraulic ram pump according to claim 1, whereas said normally open valve means employs an opposing slideable piston and cylinder means responsive to pump back pressure acting on both said normally open valve means and said opposing piston and cylinder means to approximately balance the valve closure forces;

said valve closure forces are slightly biased to close normally open valve means;

said normally open valve means and said opposing piston means are integral having an axially aligned communication port;

~~additionally having an adjustable spring assist to open said normally open valve means employs an adjustable spring to maintain said normally open valve means in the normally open position.~~

15. (Currently amended) A downhole hydraulic ram pump according to claim 1, whereas said normally closed valve means employs an adjustable spring or weight ~~assist to close;~~, ~~said adjustable spring or weight maintains said normally closed valve means in the normally closed position until the adjustable spring force or weight is overcome by formation fluid flow force as said formation fluid flow enters said pressure chamber means.~~

16. (Currently amended) A downhole hydraulic ram pump according to claim 1, ~~whereas in lieu of said normally closed valve means and said normally open valve means including includes~~ a wireline retrievable valve unit, axially aligned with the said chamber means, comprised of ~~said a normally closed valve means and said a normally open valve means;~~ and a wireline tool profile for running and pulling said wireline retrievable valve unit;

~~said wireline retrievable valve unit outer profile can be landed, sealed, and secured within an internal profile disposed within~~ said chamber means extended ~~normally closed inlet; and said main body formation fluid outlet;~~

~~having at least one side port for formation fluid flow to said wireline retrievable valve unit~~ normally closed valve means;

having at least one side port for formation fluid flow to said wireline
retrievable valve unit normally open valve means; said side port aligned with a fluid
passageway exterior of said chamber means extension and into said main body;
 retrievable through said tubing chamber means extension continuing
upwards through said intrusive tubing means.

17. (Currently amended) A downhole hydraulic ram pump according to claim 1,
~~further including said closed valve means said normally closed valve means further~~
comprises a replaceable check valve and seat, said seat being reversible.

18. (Currently amended) A downhole hydraulic ram pump according to claim 1,
~~further including said open valve means said normally open valve means further~~
comprises a replaceable impulse valve and seat, said seat being reversible.

19. A hydraulic ram pump according to claim 1, further including said main body
~~having a restricting side port in close proximity of the said normally closed valve~~
~~means such that a gaseous substance can flow into said main.~~

20. (Currently amended) A downhole hydraulic ram pump for lifting formation
fluids out of a wellbore comprising:
a main body having a formation fluid inlet passageway through which
formation fluids may flow, a lifted fluid outlet passageway through which lifted
fluid may flow, and a spent formation fluid outlet through which waste spent fluid

may flow; said formation fluid becomes said lifted fluid when said formation fluid is redirected through said lifted fluid outlet passageway, said formation fluid becomes said spent fluid when said formation fluid flows through said spent fluid outlet;

a conduit means having at least one formation fluid inlet means, providing a fluid passageway for conducting the formation fluid downward into said main body formation fluid inlet passageway;

a pressure chamber formed from said main body extending from said main body in said wellbore, separated by a normally closed valve means permitting a portion of said formation fluid, now lifted fluid, to flow through said lifted fluid outlet into said pressure chamber; said lifted fluid outlet passageway, said lifted fluid outlet passageway receives said lifted fluid flow from said main body and pressure developed in said main body from suddenly stopping said spent fluid flow from said main body at said spent formation fluid outlet passageway, said lifted fluid and pressure pass said lifted fluid outlet passageway and are stored in said pressure chamber, said pressure chamber contains both fluid and gaseous substance, said pressure is stored by compressing said gaseous substance;

a normally closed valve means is mounted at said lifted fluid outlet passageway; said normally closed valve means prevents significant said lifted fluid flow from said pressure chamber to said main body;

a normally open valve means mounted within said main body at said spent formation fluid outlet passageway, said normally open valve means permitting permits said waste spent fluid to flow out of said main body through said spent formation fluid outlet passageway, and to a formation external of the pump, said

normally open valve means closes when sufficient force is developed by passing said spent formation fluid flow, closure stops said waste fluid flow;

a tubing outlet means connecting to said pressure chamber, providing a fluid passageway through which said lifted fluid stored in said pressure chamber may flow into tubing to be lifted by the pressure stored in said pressure chamber to a higher elevation.

21. (Currently amended) The downhole hydraulic ram pump of claim 20 wherein said pressure chamber wall comprising: said tubing and said pressure chamber both suspended from a wellhead, said tubing is spaced from the within said pressure chamber wall with there being an annular space formed therebetween;

a sealing sub divides said annular space is formed into an upper annular chamber and lower annular chamber by providing a sealing sub between said upper and lower annular chambers;

said upper annular chamber may form forms an annular collecting chamber for a said gaseous substance such as air;

said lower annular chamber forms said conduit means having at least one formation fluid inlet means, providing a fluid passageway for conducting the said formation fluid fluids downward into said main body formation fluid inlet passageway;

said sealing sub functionally divides said tubing into upper tubing and lower tubing;

said lower tubing providing provides a fluid passageway for conducting the said lifted fluid upward from said main body, through said lifted fluid outlet, through said normally closed valve means, into said lower tubing;

said normally closed valve means permitting lower tubing conducts flow of lifted fluid into said upper tubing; and out through slotted tubing ports into said upper annular chamber;

said upper tubing providing provides a fluid passageway for conducting the lifted fluid upward from said upper annular chamber, through said slotted tubing ports, into said upper tubing commingling with said lifted fluid arriving from said lower tubing upward to a higher elevation or to an earth surface elevation ~~for storage and use.~~

22. (Currently amended) A downhole hydraulic ram pump according to claim 20, whereas said conduit means having has at least one sealing means ~~such as a packer assembly~~ providing a seal between the said wellbore and said conduit means, having at least one landing profile means for receiving flow control devices and other useful tools supporting tubing strings in said wellbore, said sealing means is anchored into said wellbore open hole.

23. (Currently amended) A conduit means of claim 20, whereas said conduit means having at least one formation fluid inlet means that is controllable.

24. (Currently amended) A hydraulic ram pump according to claim 20, whereas both said normally open valve means and said normally closed valve means employ an adjustable spring ~~or weight assist to open to maintain said valve means in their normal positions, said valve means remain in their normal positions until overcome by fluid flow force.~~

~~25. A hydraulic ram pump according to claim 20, whereas said normally closed valve means employs an adjustable spring or weight assist to close.~~

26. (Currently amended) A downhole hydraulic ram pump according to claim 20, whereas said normally open valve means employs an opposing slidable piston and cylinder means responsive to a pressure differential acting on both said normally open valve means and said opposing piston and cylinder means to approximately balance the valve closure forces;

 said valve means and said opposing piston means are integral or threadedly joined having an axially aligned communication port;

 said integral valve and piston ~~having employ~~ an adjustable spring assist to open ~~to bias said normally open valve in the open position.~~

27. (Currently amended) A downhole hydraulic ram pump according to claim 20, ~~further including whereas in lieu of said normally open valve means and said normally closed valve means, employ~~ a wireline retrievable valve unit comprised of:

said a normally closed valve means and said, a normally open valve means, and a wireline tool profile for running and pulling said wireline retrievable valve unit;

said wireline retrievable valve unit outer profile can be landed, sealed, and secured within said lower tubing pressure chamber and said main body;

said wireline retrievable valve unit outer profile can be landed, sealed, and secured within an internal profile disposed within said pressure chamber and said main body formation fluid outlet;

having at least one side port for formation fluid flow to said wireline retrievable valve unit normally closed valve means, said side port aligned with a fluid passageway exterior of said pressure chamber and into said main body;

~~having at least one side port for formation fluid flow to said normally open valve means, said side ports in communication with said main body formation fluid inlet passageway;~~

~~said valve unit is wireline retrievable through said tubing, retrievable through said pressure chamber continuing upwards trough said tubing.~~

28. (Currently amended) A downhole hydraulic ram pump according to claim 21, whereas said wellhead provides a at least one communication port to said upper annular chamber for removal or addition of said fluid and gaseous substance, for monitoring gas pressure, and for detecting fluid level.

29. (New) A wellbore completion design for installing in a subterranean fluid zone penetrated by an open hole wellbore comprising:

a casing structure extending from the surface to proximately the production fluid formation, to be pumped, having at least one side opening;

a first tubular structure positioned within the casing structure and continuing into the open hole; the first tubular structure comprising:

a hydraulic ram pump main body;

an anchoring and sealing device;

tubular sections spaced between the hydraulic ram pump main body and the anchoring and sealing device;

a ported tubular section;

a sealing device;

tubular sections spaced between the sealing device and the surface;

a second tubular structure positioned within the first tubular structure comprising:

a hydraulic ram pump landing sub;

a slidable sealing device for mating with the sealing device disposed within the first tubular structure;

tubular sections spaced between the hydraulic ram pump landing sub and the slidable sealing device;

a ported tubular section;

tubular sections spaced between the ported tubular section and the surface;

a casing head;

a wellhead;
a hydraulic ram pump wireline retrievable valve unit comprising:
a normally closed check valve;
a normally open impulse valve and;
an internal wireline tool profile for running and pulling the wireline
retrievable valve unit;

30. (Currently amended) The method for completing of claim 34 29, whereas said casing structure extends to the full depth of the wellbore.

31. (Currently amended) A method for pumping fluid being both liquid and gas,
from a wellbore being an open hole, penetrating a subterranean fluid zone formation
comprising the steps of:

determining the location in a subterranean fluid zone, a substantially liquid bearing formation to be pumped and the presence of at least one lower formation capable of receiving the liquid flow from upper said substantially liquid bearing formation;

suspending a first tubular string within the wellbore being an open hole, and a second tubing string within the first tubing string, both suspended from a surface device spanning said open hole, providing a fluid communication path through the first tubing string wall aligned with said substantially liquid bearing formation,
whereas substantially liquid bearing formation fluid flows down an annulus formed

between the first tubing string and the second tubing string, surrounding the second tubing string;

setting at least one packer disposed within the first tubing string, within the open hole below said substantially liquid bearing formation and sealingly against the open hole wall, said packer having at least one passageway extending through said packer to continue fluid communication down said annulus;

connecting a downhole hydraulic ram pump to the end of said first tubing string in said wellbore proximate said lower receiving formation, whereas connecting said downhole hydraulic ram pump threadedly or by installing said downhole hydraulic ram pump by wireline methods or running said downhole hydraulic ram pump attached to tubing, thereby lowering said pump into said first tubing string landing, locking, and sealing said downhole hydraulic ram pump in place;

operating said downhole hydraulic ram pump, providing a fluid communication path through said downhole hydraulic ram pump, thereby exiting said substantially liquid formation fluid from said downhole hydraulic ram pump intermittently as waste fluid, farther providing fluid communication with said lower receiving formation exterior of said downhole hydraulic ram pump;

redirecting said substantially liquid formation fluid within said downhole hydraulic ram pump, intermittently ramming said substantially liquid formation fluid into said second tubing string;

positioning said second tubing string within said first tubular string,
connecting said second tubing string and said downhole hydraulic ram pump,

whereas fluid communication for the substantially liquid formation fluid from said downhole hydraulic ram pump continuing through said second tubing string upward in the direction of the earth's surface;

setting a second sealing device disposed within the second tubing string, within the first tubing string above upper said substantially liquid bearing formation sealingly inside said first tubing string dividing said annulus into an upper and lower annulus, said lower annulus continuing to provide a fluid communication path downwardly to said downhole hydraulic ram pump, said upper annulus being capped by said surface device forming a large annulus chamber;

providing a fluid communication path through the second tubing string wall above said second sealing device, whereas said substantially liquid formation fluid may communicate with said upper annulus, collecting the gaseous component from said substantially liquid formation fluid;

responding to the downward flow of said substantially liquid formation fluid within said lower annulus, said downhole hydraulic ram pump suddenly interrupts said waste fluid flow from said downhole hydraulic ram pump creating a condition of fluid compression for a fraction of a second within said lower annulus and said downhole hydraulic ram pump;

compressing said substantially liquid formation fluid within said lower annulus and said downhole hydraulic ram pump, rams said substantially liquid formation fluid into said second tubing string thereby compressing said gaseous substance collected in said upper annulus and said substantially liquid formation fluid contained in said second tubing string, said substantially liquid formation fluid

and said gaseous substance being compressed push said substantially liquid formation fluid within said second tubing string upward to the surface thereby lessening said fluid compression condition, therefore pumping fluid being both liquid and gas, from a wellbore being an open hole, penetrating a subterranean fluid zone formation.

32. (Currently amended) The system of claim 31, further comprising: ~~an anchoring and sealing device such as a packer attached within a packer disposed within said first tubular string; wherein an anchoring and sealing device a packer is sealingly engaged below the casing flow openings said substantially liquid formation, and above said easing lower end within said casing receiving formation.~~

33. (New) An installation method for claim 29, whereas a subterranean fluid zone penetrated by a open hole wellbore, having a downhole hydraulic ram pump disposed therein for pumping formation fluids from the wellbore comprising the steps of:

positioning a casing structure having more than one side opening in the wellbore, from the surface to proximately the production fluid formation, to be pumped, such that side opening is aligned with the production fluid formation, and the production fluid flow is into the casing structure;

positioning the casing structure to extend past the production fluid formation one or two sections of casing in order to receive an anchoring and sealing device and for cementing in place below the production fluid formation, the casing structure

provides porting enabling communication external to the casing structure during cementing;

flowing cementitious material down the casing and out the porting externally about the casing structure, clearing the internal casing structure of cementitious material, forming a seal and anchoring means between the open hole wellbore and the casing structure, holding the production fluid formation clear of cementitious material;

positioning a first tubular structure within the casing structure, the end of first tubular structure continuing into the open hole until arriving near the production fluid receiving formation and above the receiving formation liquid level encountered;

setting the anchoring and sealing device within the casing structure, fixing the position of the first tubular structure relative to the casing structure and sealingly engaging below the casing structure side opening, and above the casing structure lower end within the casing structure, so that production fluid flow is prevented between the casing structure and first tubular structure below the anchoring and sealing device;

positioning the ported tubular section, within the casing structure, aligning the tubular section ports with the casing structure side opening, where production fluid flow is into the first tubular structure;

positioning a second tubular structure within the first tubular structure; connecting a hydraulic ram pump landing sub, an element of the pump with an internal profile enabled to receive a hydraulic ram pump wireline retrievable

valve unit, to the end of the second tubular structure and inserting the landing sub device, sealingly engaged, within the hydraulic ram pump main body disposed within the first tubular structure;

spacing tubular sections between the hydraulic ram pump landing sub and a slidable sealing device;

positioning a slidable sealing device for mating with the sealing device disposed within the first tubular structure, positioning the slidable sealing device disposed within the second tubular structure within its mating and sealing device, sealingly engaged, whereas the slidable sealing device is enabled to move downward within the sealing device, lowering the second tubular structure, while remaining sealingly engaged;

connecting a ported tubular section to the upper end of the slidable sealing device disposed within the second tubular structure;

spacing tubular sections between the ported tubular section and the surface; installing a casing head at the surface onto the casing structure and mounting a wellhead on the casing head;

suspending the first tubing structure from the wellhead, supporting the weight of the first tubing structure by both the wellhead and the anchoring and sealing device;

spacing and suspending the second tubing structure from the wellhead ensuring the landing sub remains engaged within the hydraulic ram pump main body, not damaging the bearing surfaces between the landing sub and the main

body, and the second tubing structure remains relatively straight within the first tubing structure;

running by wireline and installing a hydraulic ram pump wireline retrievable valve unit in the landing sub and the hydraulic ram pump main body;

34. (New) A downhole hydraulic ram pump according to claim 1, whereas said main body is not connected to said conduit means, but said main body is retrievable, axially aligned with said chamber means and can be landed, locked, and sealed within a landing profile deposited in said conduit means :